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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,782	08/30/2001	Rohit Sharma	081862.P257	1814

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Tarek N. Fahmi
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
Seventh Floor
12400 Wilshire Boulevard
Los Angeles, CA 90025-1026

EXAMINER	
AHMED, SALMAN	
ART UNIT	**PAPER NUMBER**
2666	

DATE MAILED: 10/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/944,782	SHARMA ET AL.	
	Examiner	Art Unit	
	Salman Ahmed	2666	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 August 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-56* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *10-15 and 25-30* is/are allowed.

6)☒ Claim(s) *1,3,4,6-9,16,18,19,21-24,31,32,34,35,37-44,46,47,49,50 and 52-56* is/are rejected.

7)☒ Claim(s) *2,5,17,20,33,36,45,48 and 51* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *8/30/01* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 3, 4, 16, 18, 19, 31, 32, 34, 35, 41, 44, 46, 47, 50, 52, 53, 54, 55 and 56 rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt et al. (US PAT5361250), hereinafter referred to as Hunt, in view of Venters et al. (US PAT 6466582), hereinafter referred to as Venters.

In regards to claims 1, 3, 4, 16, 31, 32, 41, 44, 46, 47, 50, 52, 53, 54, 55 and 56, Hunt teaches a system having a computer readable medium employing a method,

comprising: establishing a distribution pattern (column 6 line 55, inverse multiplexer) to distribute multilink frame relay (MFR) fragments (column 6 line 51, frame relay packets). In regards to claims 1, 3, 4, 16, 31, 32, 41, 44, 46, 47, 50, 52, 53, 54, 55 and 56, Hunt does not explicitly teach the distribution pattern including a sequence of link entries associated with links in a link bundle, wherein each link entry is identified when the associated link is capable of transmitting a fragment in a fastest transmit time, wherein the fastest transmit time is determined based on the link speed of the link and a transmit time for the link to transmit other fragments previously allocated to that link; and distributing the fragments according to the distribution pattern from a first link entry to a last link entry in the distribution pattern, wherein the distribution pattern is repeated after the last link entry. In regards to claim 31 Hunt does not explicitly teach a memory, a processor configured to establish a distribution pattern to distribute multilink frame relay (MFR) fragments. In regards to claims 3, 34, 18 and 46, Hunt does not explicitly teach fastest transmit time is determined based on a fragment size. In regards to claims 4, 10, and 35, Hunt does not explicitly teach when more than one link is capable of transmitting a fragment in a fastest transmit time, the link entry is identified based on an associated link having a fastest link speed.

In regards to claims 1, 3, 4, 16, 31, 32, 41, 44, 46, 47, 50, 52, 53, 54, 55 and 56 Venters teaches a distribution pattern (column 2 line 65, arbitration mechanism) including a sequence of link entries (column 2 lines 66-67, plurality of access lines) associated with links in a link bundle (column 3 line 10, aggregate data link), wherein each link entry is identified when the associated link is capable of transmitting a fragment in a fastest

transmit time (column 6 lines 58-61, parameters are configured on a per circuit basis and are used to assign priority to each of the access lines relative to the other access lines, with a higher valued parameter having priority over a lower valued parameter) , wherein the fastest transmit time is determined based on the link speed of the link (column 6 line 56, purchased data rate) and a transmit time for the link to transmit other fragments previously allocated to that link (column 6 line 55, average throughput); and distributing the fragments according to the distribution pattern from a first link entry to a last link entry in the distribution pattern, wherein the distribution pattern is repeated after the last link entry is anticipated by (column 3 lines 11-13) accommodating periods of aggregate link congestion in a fair, orderly and predictable manner. In regards to claim 31, Venters teach a memory (column 6 line 57, memory) and a processor (column 3 line 18, control processor). In regards to claims 3, 34, 18 and 46, Venters teaches fastest transmit time is determined based on a fragment size (column 6 line 8, Arbitration Value =Offset+Bias+Scale*(FrameLength/CIR-WaitTime). In regards to claims 4, 10, and 35, Venters teaches when more than one link is capable of transmitting a fragment in a fastest transmit time, the link entry is identified based on an associated link having a fastest link speed (column 8 lines 42-48, of determining which channel unit of interest has the higher priority physical address. In this case the routine transitions to step 313, in which that channel unit takes ownership of the aggregate data link 21, transmits its packet).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hunt's teaching by incorporating the Multiframe Frame

Relay distribution scheme as taught by Venters. The motivation is that (Venters: column 2 lines 45-55) in order to provide an orderly and efficient allocation of the limited bandwidth of the aggregate link to each access line requesting service, yet without allowing any individual access line to tie up the aggregate data link during periods of inactivity or congestion, the statistical multiplexing of data from the access lines to the aggregate data link is based upon a prescribed opportunity-to-transmit arbitration mechanism, that is distributed among all users of the system, so that the state of the system is effectively shared with each access line.

4. Claims 6, 8, 21, 23, 37, 39, 42, 43, 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt in view of Venters, and in view of Ben-Nun et al. (US PAT 5483526), hereinafter referred to as Ben-Num.

In regards to claims 6, 8, 21, 23, 37, 39, 42, 43, 49 Hunt in view of Venters teaches of arbitration method for a multilink frame relay system as described in the rejections of claims 1, 16, 31, 41 and 44 above.

In regards to claims 6, 21, 37, 42, 49 Hunt in view of Venters does not explicitly teach the steps of determining if a link associated with the selected link entry has available credit; when the link has available credit, distributing the fragment to the link and reducing the credit available to that link; and when the link does not have available credit, selecting a next link entry in the sequence.

In regards to claims 6, 21, 37, 42, 49 Ben-Nun teaches (column 2 lines 29-35) ATM credit based flow control requires that a cell not be transmitted on a communication link unless the sender knows that a buffer is available at the receiver to hold the cell. The sender maintains a "credit balance" for each virtual circuit (VC). As cells are sent, the sender decrements the balance, and refrains from sending a new cell if the balance is zero.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hunt in view of Venters' teaching by incorporating the teaching of credit based flow control as taught by Ben-Nun. The motivation is that (as taught by Ben-Nun, column 2 lines 25-29) a common method of controlling traffic, also known as flow control, is called the credit-based, per hop, per virtual circuit (VC) flow control. This method allows the network links to operate near full capacity without cell loss or instability.

In regards to claim 8, 23, 39, 43 Venter teaches (column 3 line 37, arbitration cycle) the distribution pattern is repeated at the first link entry and before selecting the last link entry, after expiration of a predetermined waiting time period to receive a fragment to be distributed to a link in the link bundle.

5. Claims 9, 24, 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt in view of Venters, and in view of Lenoski et al.(US PAT 6747972), hereinafter referred to as Lenoski.

In regards to claims 9, 24, 40 Hunt in view of Venters teaches of arbitration method for a multilink frame relay system as described in the rejections of claims 1, 16 and 31 above.
In regards to claims 9, 24, 40 Hunt in view of Venters does not explicitly teach the distribution pattern being implemented as an array data structure.
In regards to claim 9, 24, 40 Lenoski teaches the distribution pattern being implemented (column 11 line 61) as an array data structure.
It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hunt in view of Venters' teaching by incorporating the teachings of Lenoski of using array data structure, as it is known in the art that collective information about an entity is easily accessed and modified if stored in data structures.

6. Claims 7, 22, 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt in view of Venters, in view of Ben-Nun and further in view of Bustini et al. (US PAT 5313454), hereinafter referred to as Bustini.

In regards to claims 7, 22, 38 Hunt in view of Venters in view of Ben-Nun teaches of arbitration method for a multilink frame relay system using credit scheme as described in the rejections of claims 6, 21, 37 above.
In regards to claims 7, 22, 38 Hunt in view of Venters in view of Ben-Nun does not explicitly teach the credit being allocated to each link based on the link speed and a periodic interval gap.

In regards to claims 7, 22, 38 Bustini teaches (column 24 lines 25-31) step 600 initializes the credit process by setting the ith virtual circuit (VC) connection's credit, Ti, equal to Di, where Di=N/Ni or the number of tick intervals, T, that must elapse for VC connection i to acquire access to the cell network. Thus, Di is derived from the current value of Ni generated by bandwidth assignment process 500

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hunt in view of Venters in view of Ben-Nun's teaching by incorporating the credit allocation scheme as taught by Bustini because a common method (Ben-Nun, column 2 lines 25-28) used in the art for controlling traffic, also known as flow control, is called the credit-based, per hop, per virtual circuit (VC) flow control.

Allowable Subject Matter

7. Claims 2, 5, 17, 20, 33, 36, 45, 48 and 51 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. Claims 10-15 and 25-30 are allowed.

9. The following is an examiner's statement of reasons for allowance:

The instant application claims a computer readable medium having stored thereon sequences of instructions which are executable by a system employs a method,

comprising: determining a number of positions in a distribution pattern; identifying a link entry for a first position in the distribution pattern, comprising; selecting a link in the link bundle that is capable of transmitting a first fragment in a fastest time based on the link speed of each link, a total transmit time associated with each link, and a fragment size; placing a link entry associated with the selected link in the first position in the distribution pattern; adding the fastest transmit time to the total transmit time associated with the selected link; and repeating said identifying for a link entry for a next position in the distribution pattern to transmit a next fragment until a link entry is selected for all positions in the distribution pattern.

The cited prior art Hunt teaches a WAN is formed using Frame Relay Protocol and a telephone network interface unit. An originating LAN sends a message to a router which communicates with a telephone network interface unit using Frame Relay Protocol. The telephone network interface unit determines the destination of a packet received from the router by interpreting the Frame Relay Protocol, and it associates a phone number with that destination. The interface unit uses the phone number to establish at least one DSO connection over a digital telephone network to a destination network interface. A destination network interface unit receives the packet from the digital telephone network and provides the packet to a router, which interfaces to the destination LAN. The network interface units add or drop additional DSO channels as required by the traffic load and thereby provide variable bandwidth.

The cited prior art Venters teaches an arbitration mechanism is distributed among channel units of a statistically multiplexed frame relay switching system serving a plurality of access lines, the cumulative bandwidth of which exceeds that of an aggregate data link over which data is to be transported. For each access line, an arbitration code is generated. This code includes a transmit request or start bit, a calculated multibit arbitration value based upon a combination of parameters, including queuing delay and the configuration and traffic rate of the line, and an address code that identifies the physical location of the respective channel unit. All arbitration codes are readable by each frame relay channel unit via a wire-ORed bus. A channel unit participating in an arbitration cycle compares the value of its arbitration code with those of the other participants. That channel unit whose arbitration code is uniquely the largest of all arbitration participants takes ownership of the aggregate data link, transmits data, and then releases the link.

The cited prior art Ben-Nun teaches a method and apparatus for a resynchronization of a local memory buffer management scheme for an asynchronous transfer mode (ATM) adapter implementing credit based flow control.

Enhanced Frame Solutions Multilink Frame July 2001 by Lucent Technologies Inc. teaches how MLFR splits high-speed frame relay transmissions over several lower speed frame relay links. This capability enables service providers to consolidate two or more physical or logical links into one higher speed frame relay link. The paper identified two types of MLFR: End-to-End MLFR and User-to-Network (UNI)/Network to Network (NNI) MLFR. End-to-End MLFR, defined in FRF.15, provides higher bandwidth

links by aggregating multiple virtual connections. Implemented only on Customer Premise Equipment (CPE), End-to-End MLFR is transparent to any intervening networks used to transport the multiplexed data. In contrast, UNI/NNI MLFR, defined in FRF.16, multiplexes several physical or logical interfaces to create a single, higher-speed logical link over the transport network (or networks). The UNI/NNI MLFR protocol defined in FRF.16 is designed to ensure interoperability among the various vendor devices used to consolidate low-speed frame relay links into higher-speed connections.

The cited prior arts alone or in combination fail to jointly suggest or teach the claimed combination of features as taught by the instant application. Venters, Ben-Num and cited white paper from Lucent technologies Inc. do not specifically teach a computer readable medium having stored thereon sequences of instructions which are executable by a system, and which, when executed by the system to employ a method, comprising: determining a number of positions in a distribution pattern; identifying a link entry for a first position in the distribution pattern, comprising; selecting a link in the link bundle that is capable of transmitting a first fragment in a fastest time based on the link speed of each link, a total transmit time associated with each link, and a fragment size; placing a link entry associated with the selected link in the first position in the distribution pattern; adding the fastest transmit time to the total transmit time associated with the selected link; and repeating said identifying for a link entry for a next position in the distribution pattern to transmit a next fragment until a link entry is selected for all positions in the distribution pattern.

10. Prior art pertinent to the application but not used in office action:

- US 6819658 B1 USPATMethod and apparatus for segmentation, reassembly and inverse multiplexing of packets and ATM cells over satellite/wireless networks Agarwal; Anil K. et al.
- US 6876657 B1 USPATSystem and method for router packet control and ordering Brewer; Tony M. et al.
- US 6882799 B1 USPATMulti-grained network Beshai; Maged E. et al.
- US 6891836 B1 USPATSwitching complex architecture and operationChen; David X. et al.
- US 6934249 B1 USPATMethod and system for minimizing the connection set up time in high speed packet switching networks Bertin; Olivier et al.
- WO 200049832 A DERWENTStuffing cells determining method in integrated services digital network, frame relay, involves processing reference clock signal and clock signal obtained from ATM link to obtain indication of frequency difference HEIKKINEN, P et al.
- US 20050207371 A1 US-PGPUBSwitching complex architecture and operation Chen, David X. et al.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Salman Ahmed whose telephone number is (571)272-8307. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on (571)272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Salman Ahmed
Examiner
Art Unit 2666

SA

Seema S. Rao
SEEMA S. RAO 10/3/05
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600